

**ABSTRACT**

A method and system for measuring the electrical impedance of sections of a living body. The measurement is carried out utilizing a plurality of electrodes each of which is disposed on a section of the living body, where the electrodes are capable of applying an electrical current through at least one probed section, and measure the electrical voltage over the probed section. The voltages over the probed sections are measured and the impedances ( $Z(t)$ ) and their changes ( $\Delta Z(t)$ ), and the resistances  $R(t)$  and their changes ( $\Delta R(t)$ ), are calculated, by considering the electrical current distortion components resulting from the electrical currents flowing in the other sections which are not probed, utilizing an electrical model based on the distribution of the electrical currents through the body sections. The measuring is preferably performed by applying an electrical current through the probed section of the living body via a pair of electrodes, and measuring the electrical voltage over the probed section and over the other sections, applying an electrical current through one or more of the other sections and at each instance measuring the electrical voltage over the other sections; and calculating the impedance and resistance and the changes utilizing the measurements and the applied currents, according to the electrical model.